β **WHAT IS CLAIMED IS:**

~~CLAIMS~~

1. An arrangement for monitoring/managing routing in a communications network comprising a number of routing domains (100), each comprising a number of routing areas (10,20,30) containing a number of network nodes (11-15,21,22,25,31,33,34,35) which communicate via transmission links (L1-L9), each routing domain (100) being administrated as one unit by administrating means and link state routing using link state routing protocols being implemented,

c h a r a c t e r i z e d   i n

that there is one link state database for each routing area (10,20,30) which is maintained by each network node (11-15,21,22,25,31,33,34,35) of the routing area, that each network node (11-15,21,22,25,31,33,34,35) belongs to at least one routing area (10,20,30) and maintains one link state database for each routing area it belongs to, that at least for some of the routing areas a routing controlling device (15,25,35) is provided which belongs to the routing process of the respective area and which contains (a copy of) the link state database of said routing area(s) which is/are identical with the link state database of the network nodes, that each routing controlling device (15,25,35) is connected to a network node (14,21,31) of the respective routing area(s) it belongs to, and in that means are provided for rejecting non-routing information/traffic to the routing controlling device (15,25,35) and means for injecting routing information from the routing controlling device (15,25,35) into the link state routing process of the respective routing area it belongs to.

2. An arrangement according to claim 1,
c h a r a c t e r i z e d   i n

that there is one routing controlling device (15,25,35) for each
routing area (10,20,30).

3. An arrangement according to claim 1,
5   c h a r a c t e r i z e d   i n
that at least one routing controlling device belongs to more than
one routing area.

4. An arrangement according to any one of claims 1-3,
10   c h a r a c t e r i z e d   i n
that a routing domain comprises more than one routing area.

5. An arrangement according to any one of claims 1-4,
c h a r a c t e r i z e d   i n
15   that the means for injecting routing information injects link
state database records of the respective link state routing
process into the link state process of the respective area(s) it
belongs to.

20   6. An arrangement according to any one of the preceding claims,
c h a r a c t e r i z e d   i n
that a routing controlling device (15,25,35) only is connected to
one network node of the respective area(s) it belongs to.

25   7. An arrangement according to any one of claims 1-5,
c h a r a c t e r i z e d   i n
that a routing controlling device is connected to more than one
network node of the routing area it belongs to.

30   8. An arrangement according to any one of the preceding claims,
c h a r a c t e r i z e d   i n

that the routing controlling device(s) monitors and/or manages updates/changes in the network nodes of its respective routing area(s).

5   9. An arrangement according to any one of the preceding claims, c h a r a c t e r i z e d   i n
that a routing controlling device (15,25,35) simulates the network nodes of its routing area(s) when injecting messages in the routing process(es) of the respective routing area when there e.g.
10 is a change on a link so that the messages appear to be issued by a network node for purposes of fulfilling a used protocol and such that the messages are accepted by the network nodes.

10. An arrangement according to any one of the preceding claims,
15 c h a r a c t e r i z e d   i n
that the network is Internet.

11. An arrangement according to claim 10, c h a r a c t e r i z e d   i n
20 that at least some of the network nodes comprise routers (11-15,21,22,25,31,33,34,35).

12. An arrangement according to claim 11, c h a r a c t e r i z e d   i n
25 that the used link state routing protocol is OSPF (Open Shortest Path First).

13. An arrangement according to any one of claims 10-12, c h a r a c t e r i z e d   i n
30 that the administrating means is an ISP (Internet Service Provider).

14. An arrangement according to any one of claims 10-13,

c h a r a c t e r i z e d   i n
that the routing protocol comprises a link state update protocol
and a link state acknowledgment protocol for ensuring that all
routers within the area comprise the same link state database and
5 in that the routers send LSA:s (Link State Acknowledgments)
between each other and in that for each destination of a packet/
message, the router uses an algorithm to find the shortest path.

15. An arrangement according to claim 9 and 14,
10 c h a r a c t e r i z e d   i n
that the routing controlling device transforms a network change
within its area(s) into LSA records, e.g. through manipulating LSA
records in the link state database, and in that the manipulated
LSA records are flooded throughout the respective routing area(s).

15 16. An arrangement according to any one of claims 1-9,
c h a r a c t e r i z e d   i n
that the network is an ATM network and in that the network nodes
comprise switches and in that e.g. the PNNI (Private Network to
20 Network Interface) link state protocol is used.

17. A routing controlling device (15,25,35) for controlling
routing within a routing area (10;20;30) of a routing domain
(100), which routing area comprises a number of network nodes
25 (11,12,13,14,15;21,13,22,25;22,31,33,34,35) communicating via
transmission links, in which link state routing is implemented,
c h a r a c t e r i z e d   i n
that each network node comprises a link state database which is
the same for all nodes within the same routing area (10;20;30) and
30 in that the routing controlling device (15;25,35) comprises a copy
of the link state database which is identical to the link state
databases of the network nodes and in that means are provided for
preventing non-routing information to the routing controlling

device and for injecting routing information into the link state routing process, the routing device thus only handling routing information and being connected to at least one network node.

5   18. A device according to claim 17,
c h a r a c t e r i z e d   i n
that the routing controlling device (15;25;35) controls the routing in more than one routing area and in that it comprises a copy of the link state database of each of said routing areas.

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19. A device according to claim 17 or 18,
c h a r a c t e r i z e d   i n
that the means for injecting routing information injects transformed link state database records into the link state
15   routing process of the routing area.

20. A device according to claim 19,
c h a r a c t e r i z e d   i n
that it simulates the network nodes of its routing area(s) through
20   injecting messages (database records) when there e.g. has been a change on a transmission link such that the message(s) appear(s) to be issued by the network node connected to the transmission link.

25   21. A device according to any one of claims 17-20,
c h a r a c t e r i z e d   i n
that it monitor and/or manages updates/changes in the network nodes.

30   22. A method of controlling routing in a routing area of a routing domain, which routing area comprises a number of network nodes, through implementation of link state routing,
c h a r a c t e r i z e d   i n

that it comprises the steps of:

- providing a routing controlling device for the routing area which only handles information messages relating to routing,
- providing a copy of the link state database as is provided in each network node of the area in the routing controlling device so that the device forms part of the routing process,
- providing information to the routing controlling means relating to updates/changes within the routing area,
- transforming the updated/new information into link state acknowledgments (link state database records) in the routing controlling device,
- sending the link state database records (new LSA:s) to the network nodes within the routing area from the routing controlling device,
- flooding the updated information into the routing area and updating the link state databases.

23. The method of claim 22, c h a r a c t e r i z e d i n that it further comprises the steps of:

- controlling more than one routing area from a routing controlling device,
- maintaining a copy of the link state database of each routing area in the routing controlling means,
- providing the network nodes of the respective area with the updated information of the respective area through sending LSA:s of the respective routing area to the network nodes of the appropriate area.